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Students were taught, only a few years ago, that malaria was spread by "foggy night air," by "miasma" (whatever that might have been), and by other mysterious, mistaken means. With the present knowledge concerning the rôle which the anopheles mosquito plays in transmitting "fever and ague," we smile at these former silly beliefs. It can be safely prophesied that soon, in the light of more exact knowledge, we shall be similarly amused over many of the absurd ideas which the various camps of medicine today hold concerning the dissemination of contagious diseases. Then, perhaps, outlandish maneuvers like imprisoning and impoverishing a whole family and adding insult to injury by fumigating them with formaldehyde, will appear as ludicrous and crude as some of the antics of my antique predecessors, the barber physicians.

In view of the evidence we must recognize that the time has come when the fear of contagions ought to be modified and ruled by common sense. If a horse is dangerous only when he kicks it is silly to be frightened by his whinny. The important precaution is to avoid his heels and hoofs. In most communities the attitude of extreme caution toward contagious illnesses is practically the same as it was thirty or more years ago. The shadow still causes as much consternation as the substance. So needless anxiety, increased expense and harsh quarantine methods are the tributes paid on account of the old fashioned "bogy" ideas of air-borne contagion and other "fogy," heirloom visions of dangerous channels of infection handed down by generations of frightened ancestors.

(*To be continued*).

THE MAKING OF SOLUTIONS[1]

By MAUD LANDIS, R.N.

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Whether the school girl does not make practical application of her arithmetical problems or whether the time between her high school graduation and her entrance into the training school has allowed her to forget what she has learned, I cannot say, but it has been my observation that most nurses have only a vague understanding of how to make solutions for general use in the hospital or when they are out in private practice.

During training, we may call the pupil nurse's attention to the necessity of separating poisons from other medicines; by distinguishing poisons from other drugs, in using colored bottles, or bottles oddly shaped or rough feeling, or bottles with bells on the corks, but if she doesn't understand the various strengths of solutions and how to make them, we have an ever-present danger in our stock solution bottles. In our service rooms we may have our solution lists telling just the quantity of the stock solutions necessary to make certain strengths in certain quantities but the pupil nurse can misread directions at times. The surgeon and the patient have implicit confidence in the nurse's ability to make the solution and not until some accident occurs do we realize the necessity of constant drill.

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[1] Read at the eighth annual meeting of the Missouri State Nurses' Association.

It has been my observation when grading papers after the state examinations that an understanding of solutions is the nurse's weakest point. This might be explained on the score that the nurse is nervous over the examinations and does not do herself justice. There is also the other reason that she is not so sure of herself mathematically, and if the answer is not right, it is wrong.

You may say we require a high school preparation for entrance into our training school so, surely, it should not be expected that we should teach the elementry principles of arithmetic. Yet I think this is necessary for so much of importance throughout the nurse's training and after she finishes is dependent on this accurate knowledge. Of course, we will not need to take a great deal of time for this review, probably eight lessons will allow sufficient drill; include seniors, intermediates, juniors, and even the preliminaries.

First, have the nurse relearn her tables of weights and measures in American and French systems. She may think she is prepared but reciting in class differs from reciting to herself or a classmate and she makes many mistakes. Not only give her problems illustrating these tables to bring to the next class but give her similar problems in class, have her go to the board, this is a crucial test, also a real victory, if she works her problem with all the class looking on, critically helpful.

Second, review fractions, explain proper and improper and decimal fractions; have her add, subtract, multiply and divide fractions; have her reduce improper fractions to proper fractions and decimals and vice versa. You will be surprised to see how many confuse the word *of,* as 1/3 of 1/4, for the sign of division or to notice how often the divisor is not inverted. Explain how to ascertain the least common multiple.

Third, explain the possible interchange between fractions and proportion or per cent and decimals. The whole of anything always has a value of 100 per cent. Bichloride (1–500), becomes bichloride 1/500. To ascertain the per cent, bichloride 1/500 of 100 per cent is 1/5 of 1 per cent or 0.002.

Since 1 gallon equals 128 ounces or 1024 drams, 1/500 equals 2 drams (plus) the quantity of the pure drug necessary for the stock solution. Carbolic (1–20) becomes carbolic, 1/20; in per cent it becomes 5 per cent, or 0.05. Vice versa, formalin, 1/8 of 1 per cent equals 0.00125, in fractions, becomes 1/8000 or 1–8000. Boracic 4 per cent equals 0.04 equals 1–25 or 1/25. Then, whether using American or metric measure, you may determine the quantity required, using either the fraction or per cent sign. This knowledge is especially important to the nurse after she leaves her school, for her orders may be given in per cent, when she was accustomed, during her training, to proportions as the bases.

Fourth, when proportions are not given it is sometimes necessary to use per cent, especially in dealing with the chemically pure drug; for instance, the order is given for silver nitrate 2 per cent, argyrol 25 per cent, physiologic salt 6/10 of 1 per cent, or 9/10 of 1 per cent, cocaine, 4 per cent or 10 per cent.

Based on the fact that 1 ounce or 480 grains represent 100 per cent, 4.8 grains equals 1 per cent, but for convenience we adopt the approximate rule, 5 grains of the pure drug to 1 ounce of fluid equals 1 per cent.

Fifth, another necessary rule for the nurse to learn is, "Divide what you want by what you have," the result being the fractional part you may use of tablet or stock solution. I mention bichloride (1–500) as illustrative of a problem, the fraction 1/500 being harder, apparently, for the pupil nurse to handle than some smaller proportion. Bichloride (1–4000) is ordered. Mentally, we know that 1/8 of the required solution will be the stock solution, but the pupil nurse must know how she ascertains this. Use the rule just mentioned, 1/4000 divided by 1/500 equals 1/4000 multiplied by 500 over 1 equals 1/8.

Hypodermic tablets should always be ordered in the strengths required, but in the emergency, we have an order for strych. sulph. gr. 1/50 with only gr. 1/60 in supply. Apply the same rule, 1/50 divided by 1/60 equals 1/50 times 60 over 1, equals 6/5 tablets, or 1–1/5 tablets. Pinching off 1/5 of the second tablet and adding it to the first one, is too inaccurate to consider. It requires too much time to dissolve 1 tablet and then dissolve 1/5 of the second, so since there is a waste of part of the second tablet, anyway, we know 3/5 of 2 tablets will be needed. If your hypodermic syringe has a capacity of 20 to 25 or 30 minims, it is easy to measure the water, expel into the spoon, dissolve and sterilize the 2 tablets, draw into the syringe, and expel 2/5 of the quantity, leaving 3/5 or 12, or 15, or 18 minims, according to your hypo's capacity. Suppose, however, you should require 3/4 of some tablet. If your syringe has a capacity of 25 or 30 minims you must teach that only some multiple of 4 will allow a correct quantity of the solution to be given, as to give a part of 1 minim is impossible.

Take this problem: the doctor orders atroph. sulph., gr. 1/300, and you have on hand atroph. sulph. gr. 1/150. During the last examination it was not the exception, by any means, to have the nurse answer "Use two tablets."

You will find too many nurses pinch their tablets, too many guess at the strengths of solutions; "cherry-red," for permanganate, to one nurse might look like "American Beauty" red to another.

Sixth, teach accuracy in weight and measurement; teach how to hold the measuring glass, how to distinguish between the French and American markings; teach that a few drops, more or less make measurements inaccurate and incorrect; teach, that in absolute silence, with nothing else to be considered at the time, must the nurse follow out the rule of three, in measuring.

All of these suggestions have to do with the nurse's making solutions; it is a part of the surgical technique. There will be times during her training when she will need this accurate knowledge. Always have her use pencil and paper, throughout this drill. Many, no doubt, could solve mentally but until after this drill the nurse must learn to reason on paper, not to jump at conclusions as the mental process allows.

This review will make it possible for the nurse to solve any problem that might arise. You can use many other rules and gain correct answers by other methods and that is quite permissible to you, as teachers, but uniformity in making solutions will do away with errors and will prevent confusion among the nurses in emergencies.

This may sound almost too elementary to present to superintendents because all are teaching just these principles, but my presumption in using this subject has been prompted by the unmistakable evidence of lack of understanding of making solutions among nurses.

INSPECTION OF NURSE SCHOOLS IN NEW YORK STATE

By AMY M. HILLIARD, R.N.

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The work that my predecessor accomplished as Inspector of Nurse Training Schools is so well known and so keenly appreciated that it needs no comment. Nobody can feel more than I do how difficult it is to succeed her. As the appointment of her successor was not made until late in January, it was impossible for me to take up the work until two weeks after Miss Goodrich had gone to Teachers College.